the foregoing description. Accordingly, it is intended that the present invention embrace all such alternatives, modifications and variations as fall within the scope of the appended claims.

What is claimed is:

Fig. 4 1. A radio frequency amplifier apparatus, comprising:

a distributed radio frequency amplifier having a plurality of stages, the distributed radio frequency amplifier having an output stage that drives a load, the load having a load impedance;

a drive signal synthesizer driving the plurality of amplifier stages;

means for measuring a circuit parameter indicative of the load impedance; and

means responsive to the measuring means for changing a drive signal produced by the drive signal synthesizer to compensate for the change in load impedance.

2. The apparatus according to claim 1, wherein the means for measuring comprises a directional coupler.

3. The apparatus according to claim 2, wherein the distributed radio frequency amplifier has N stages, and wherein the directional coupler connects the N^{th} stage with the $(N-1)^{st}$ stage.

4. The apparatus according to claim 2, wherein the means for measuring is implemented in a programmed processor coupled to the directional coupler to calculate the load impedance.

5. The apparatus according to claim 1, wherein the means for changing the drive signal is implemented in a programmed processor.

6. The apparatus according to claim 1, wherein the means for changing the drive signal changes a drive signal to the output stage.

7. The apparatus according to claim 6, wherein the drive signal to the output stage is changed to produce a current output from the last stage given by:

$$i_N = A_O\,(\,N \cdot (R / Z_L) - N + 1)$$

where: N is the number of stages in the distributed amplifier,

A_O is the amplitude of the current applied to the first N-1 stages of the distributed amplifier;

R is the desired load impedance; and

Z_L is the measured load impedance.

8. The apparatus according to claim 1, wherein the means for changing the drive signal changes a plurality of drive signals to the distributed amplifier.

9. The apparatus according to claim 1, wherein the means for changing the drive signal comprises:

means for categorizing the load impedance; and

means for changing one or more drive signals to the distributed amplifier based upon the category of the load impedance.

10. The apparatus according to claim 9, wherein the category is used as an index to a look-up table to determine how to change the one or more drive signals.

11. The apparatus according to claim 1, wherein the distributed amplifier has N stages with the N^{th} stage comprising the output stage, and wherein each stage has a transmission line impedance, and wherein the transmission line impedance of each stage decreases progressively from stage 1 to stage N.

12. The apparatus according to claim 1, wherein the circuit parameter comprises at least one of the following: a DC current, a DC voltage, an RF current, an RF voltage, a measure of reflected power, a measure of incident power, and a standing wave ratio.

13. The apparatus according to claim 1, wherein the distributed amplifier is fabricated from a plurality of junction transistors.

14. The apparatus according to claim 1, wherein the distributed amplifier is fabricated from a plurality of field effect transistors.

15. A radio frequency power amplifier apparatus, comprising:

a distributed radio frequency amplifier having a plurality of N stages, the distributed radio frequency amplifier having an output at the N^{th} stage that drives a load, the load having a load impedance;

a drive signal synthesizer driving the plurality of amplifier stages;

a directional coupler coupling the N^{th} stage to the $(N-1)^{th}$ stage, and providing an coupler output for measuring a circuit parameter indicative of a change in the load impedance; and

a programmed processor receiving the coupler output that computes a required change in drive signal to compensate for the change in load impedance, and which changes a drive signal produced by the drive signal synthesizer to compensate for the change in load impedance.

16. The apparatus according to claim 15, wherein the drive signal to the output stage is changed to produce a current output from the last stage given by:

$$i_N = A_O\,(\,N\cdot(R / Z_L) - N + 1)$$

where: N is the number of stages in the distributed amplifier,

A_O is the amplitude of the current applied to the first N-1 stages of the distributed amplifier;

R is the desired load impedance; and

Z_L is the computed load impedance.

17. The apparatus according to claim 15, wherein the programmed processor categorizes the load impedance and changes one or more drive signals to the distributed amplifier based upon the category of the load impedance.

18. The apparatus according to claim 17, wherein the category is used as an index to a look-up table to determine how to change the one or more drive signals.

19. The apparatus according to claim 15, each stage of the distributed amplifier has a transmission line impedance, and wherein the transmission line impedance of each stage decreases progressively from stage 1 to stage N.

Fig. 6

20. A radio frequency power amplifier apparatus, comprising:

a distributed radio frequency amplifier having a plurality of stages each with an input, the distributed radio frequency amplifier having an output stage that drives a load, the load having a load impedance;

a drive signal synthesizer driving the distributed amplifier;

means for (160) measuring a circuit parameter indicative of a change in the load impedance; and

means responsive (170) to the measuring means for changing a plurality of drive signals produced by the drive signal synthesizer to compensate for the change in load impedance.

21. The apparatus according to claim 20, wherein the means for measuring comprises a directional coupler.

22. The apparatus according to claim 21, wherein the distributed radio frequency amplifier has N stages, and wherein the directional coupler connects the Nth stage with the (N-1)st stage.

23. The apparatus according to claim 21, wherein the means for measuring is implemented in a programmed processor coupled to the directional coupler to calculate the load impedance.

24. The apparatus according to claim 20, wherein the means for changing the drive signal is implemented in a programmed processor.

25. The apparatus according to claim 20, wherein the means for changing the drive signals comprises:

means for categorizing the load impedance; and

means for changing the drive signals to the distributed amplifier based upon the category of the load impedance.

26. The apparatus according to claim 25, wherein the category is used as an index to a look-up table to determine how to change the one or more drive signals.

27. The apparatus according to claim 20, wherein the circuit parameter comprises at least one of the following: a DC current, a DC voltage, an RF current, an RF voltage, a measure of reflected power, a measure of incident power, and a standing wave ratio.

28. A method of compensating for load impedance in an N stage distributed amplifier, comprising:

measuring a circuit parameter indicative of a change in a load impedance;

calculating a current required from a last stage of the distributed amplifier to make the load impedance appear to be a desired impedance; and

applying an input to the last stage of the distributed amplifier to achieve the calculated current from the last stage of the distributed amplifier.

29. The method according to claim 28, wherein the input to the last stage produces a current output from the last stage given by:

$$i_N = A_O\,(\,N \cdot (R / Z_L) - N + 1)$$

where: N is the number of stages in the distributed amplifier,

A_O is the amplitude of the current applied to the first N-1 stages of the distributed amplifier;

R is the desired load impedance; and

Z_L is the measured load impedance.

30. The method according to claim 28, wherein the load impedance is measured using a directional coupler.

31. The method according to claim 30, wherein the distributed amplifier has N stages, and wherein the directional coupler connects the N^{th} stage with the $(N-1)^{st}$ stage.

32. The method according to claim 30, wherein the directional coupler is coupled to a programmed processor and wherein the programmed processor calculates the load impedance.

33. The method according to claim 28, wherein the calculating comprises categorizing the load impedance; and

wherein the applying comprises changing the drive signal to the last stage of the distributed amplifier based upon the category of the load impedance.

34. The method according to claim 33, wherein the category is used as an index to a look-up table to determine how to change the one or more drive signals.

35. The method according to claim 28, wherein the circuit parameter comprises at least one of the following: a DC current, a DC voltage, an RF current, an RF voltage, a measure of reflected power, a measure of incident power, and a standing wave ratio.

36. A method of compensating for an output load impedance in an N stage distributed amplifier, comprising:

measuring a circuit parameter indicative of the output load impedance in the distributed amplifier;

calculating one or more input signals to the N stage distributed amplifier to make a stage's load impedance appear to be a desired impedance; and

applying the one or more calculated input signals to the N stage distributed amplifier to make the stage's load impedance for at least one of the stages from stage 1 to stage N be the desired impedance.

37. The method according to claim 36, wherein the output load impedance is measured using a directional coupler.

38. The method according to claim 37, wherein the directional coupler connects the N^{th} stage with the $(N-1)^{st}$ stage.

39. The method according to claim 36, wherein the directional coupler is coupled to a programmed processor and wherein the programmed processor calculates the output load impedance.

40. The method according to claim 36, wherein calculating comprises categorizing the output load impedance; and

wherein the applying comprises changing the drive signal to the last stage of the distributed amplifier based upon the category of the output load impedance.

41. The method according to claim 40, wherein the category is used as an index to a look-up table to determine how to change the one or more drive signals.

42. The method according to claim 36, wherein the circuit parameter comprises at least one of the following: a DC current, a DC voltage, an RF current, an RF voltage, a measure of reflected power, a measure of incident power, and a standing wave ratio.